

U.S. Application Serial No. 09/456,894

Please Amend the Claims as follows:

1. (Original) A machine-readable medium having stored thereon sequences of instructions which, when executed by a processor, cause the processor to perform the acts of:

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disabling access to at least a first section of code in a network driver interface, wherein the network driver interface provides for communication between one or more media access control units and one or more protocol drivers in a computer system according to a set of bindings;

patching the first section of code to cause the insertion of a rerouting driver into the one or more communication paths provided by the set of bindings; and re-enabling access to the patched first section of code.

2. (Original) The machine-readable medium of claim 1 wherein the patching is static patching.

3. (Original) The machine-readable medium of claim 2 wherein the static patching includes inserting a template jump from the network driver interface to a template in the rerouting driver.

4. (Original) The machine-readable medium of claim 3 wherein the template jumps are inserted in the network driver interface so that a CALL instruction to the protocol driver is replaced with a JUMP to the template in the rerouting driver, the template containing the CALL instruction.

5. (Original) The machine-readable medium of claim 2 wherein the patching the first section of code creates at least one new binding between the network driver interface and the rerouting driver.

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6. (Original) The machine-readable medium of claim 5 wherein the at least one new binding provides for communication between one or more media access control units and a capturing unit in the rerouting driver.

7. (Original) The machine-readable medium of claim 6 wherein the capturing unit is used to intercept communications over the at least one new binding.

8. (Original) The machine-readable medium of claim 1 wherein the patching is dynamic patching.

9. (Original) The machine-readable medium of claim 8 wherein the dynamic patching includes establishing a new binding between at least one media access control unit and dynamic patching code in the rerouting driver, and inserting a template jump in the network driver interface to a template in the rerouting driver.

10. (Original) The machine-readable medium of claim 9 wherein the template jumps are inserted in the network driver interface so that a CALL instruction to the protocol driver is replaced with a JUMP to the template in the rerouting driver, the template containing the CALL instruction.

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11. (Original) A computer implemented method comprising:  
transmitting from a remote host to a first target computer on a network an installation application and a rerouting driver;  
transmitting from the remote host to the first target computer a command to cause the first target computer to execute the installation application;  
the first target computer, responsive to receipt of the command, executing the installation application, wherein the first target computer includes a network driver interface that provides for communication between one or more media access control units and one or more protocol drivers according to a set of bindings; and  
the first target computer, responsive to executing the installation application, causing the modification of the network driver interface to insert the rerouting driver into the one or more communication paths provided by the set of bindings without restarting the first target computer.

12. (Original) The computer implemented method of claim 11 wherein the modification of the network driver interface is by static patching.

13. (Original) The computer implemented method of claim 12 wherein the static patching further comprises inserting template jumps from the network driver interface to templates in the rerouting driver.

14. (Original) The computer implemented method of claim 13 wherein the template jumps are inserted in the network driver interface so that a CALL instruction to the protocol driver is replaced with a JUMP to the template in the rerouting driver, the template containing the CALL instruction.

15. (Original) The computer implemented method of claim 11 wherein the modification of the network driver interface is by dynamic patching.

16. (Original) The computer implemented method of claim 15 wherein the dynamic patching further comprises establishing a new binding between at least one media access control

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unit and dynamic patching code in the rerouting driver, and inserting a template jump in the network driver interface to a template in the rerouting driver.

17. (Original) The computer implemented method of claim 16 wherein the template jumps are inserted in the network driver interface so that a CALL instruction to the protocol driver is replaced with a JUMP to the template in the rerouting driver, the template containing the CALL instruction.

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18. (Original) A computer system comprising:

- a protocol driver;
- a media access control unit;
- a network driver interface to store a first binding defining a communication path between the protocol driver and the media access control unit, the network driver interface coupled to communicate packets with the media access control unit, the network driver interface patched to communicate the packets with a rerouting driver; and
- the rerouting driver being coupled to communicate the packets with the protocol driver.

19. (Original) The computer system of claim 18, the rerouting driver further comprising static patching code.

20. (Original) The computer system of claim 18, the rerouting driver further comprising dynamic patching code.

21. (Original) The computer system of claim 18, the rerouting driver further comprising a capture unit to store in a buffer one or more of the packets for evaluation

22. (Original) The computer system of claim 21, the network interface to also store a second binding defining a communication path between the rerouting driver and the media access control unit; and, the capture unit to store in the buffer the packets destined for the rerouting driver.

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23. (Original) A rerouting driver for remotely installing network drivers and software in a computer system without restarting the computer system following installation, the computer system having an operating system in which a network driver interface provides communication of information between at least one media access control unit and at least one protocol driver on the computer system, the rerouting driver comprising:

control code, for controlling the rerouting driver;

binding code, for establishing at least one binding at the network driver interface so that the rerouting driver is bound to at least one media access control unit;

patching code, for inserting template jumps into at least a first section of code in the network driver interface, the template jumps providing jumps to templates in the rerouting driver so that information from at least one media access control unit destined for at least one protocol driver is rerouted to the rerouting driver;

at least one template, for receiving information from at least one template jump in the network driver interface;

inserted code, for evaluating rerouted information received by the template jumps.

24. (Original) The rerouting driver of claim 23 wherein the control code identifies a starting memory address of the network driver interface instruction code and disables access to the first section of code, and further wherein the patching code, following the disabling of access, operates to overwrite the first section of code and additional pre-determined memory addresses so that all the pre-determined memory addresses are patched.

25. (Original) The rerouting driver of claim 23 wherein the patching code responsive to receipt of information being sent from the network driver interface, determines the instruction code address that sent the information and overwrites the first section of code at that address so that memory addresses are incrementally patched as information is received from the network driver interface.

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26. (Original) A method for disabling and re-enabling access to code in a multiprocessor system having a shared memory and a network driver interface comprising:

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selecting a first section of code in a first central processing unit that is to be modified;  
writing the first section of code into the cache memory of the first central processing unit;  
overwriting a portion of the first section of code in cache memory with blocking code to create a first version of code;  
writing the first version of code into shared memory;  
modifying the first version of code in the cache memory to create a second version of code, wherein a portion of the code following the blocking code is overwritten with template jumps to effect a static patch of the network driver interface;  
writing the second version of code into shared memory;  
modifying the second version of code in the cache memory with code to create a third version of code, wherein the blocking code is overwritten to remove the blocking code; and  
writing the third version of code into shared memory.

27. (Original) The method of claim 26 wherein the first section of code is located in the network driver interface.

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28. (Original) A machine-readable medium having stored therein instructions, which when executed, cause a set of one or more processors to perform the following:

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disabling access to a first section of code, the first section of code to be executed when to provide a communication path between a media access control unit and an application, the first section of code including a generic call; and

overwriting the first section of code with a second section of code whose execution causes execution flow to be rerouted to a third section of code in a rerouting driver, the second section of code being no larger than the first section of code,

the third section of code, when executed, completing the communication path and returning execution flow, the third section of code including additional code not present in the first section of code that is now inserted into the communication path.

29. (Original) The machine-readable medium of claim 28 wherein the second section of code contains a template jump to a template in the third section of code.

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30. (Currently Amended) A distributed packet based security system installed using a patching technique for each individual computer and enabled without shutdown or restart across a plurality of computers in a network that enables each of said plurality of computers to evaluate packets received over the network according to a predetermined standard and selectively allow transmission of such packets from the network to a protocol driver.

31. (Cancelled).

32. (Original) The distributed packet based security system of claim 30, wherein each of the plurality computers form a shared memory buffer between a user space that stores first code of the distributed packet based security system and a system address space that stores the protocol driver and second code of the distributed packet based security system, wherein said second code is coupled to said shared memory to store information regarding packets received over the network, and wherein said first code is coupled to the shared memory buffer to evaluate information stored in the shared memory buffer.

33. (Original) The distributed packet based security system of claim 30, wherein the install is performed remotely from a host computer on said network.

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34. (Original) A computer system comprising:

a plurality of networked computers each including,

a media access control unit coupled to the physical transmission medium of the network to extract packets from data provided across said medium;

a protocol driver coupled to the media access control unit; and

filter code installed in between the media access control unit and the protocol driver and enabled without shutdown or restart to evaluate said packets and selectively allow continued transmission of different ones of said packets to the protocol driver.

35. (Original) The computer system of claim 34, wherein the install is performed using a patching technique.

36. (Original) The computer system of claim 34, wherein each of the plurality computers includes a shared memory buffer between a user space that stores a security application and a system address space that stores the media access control unit, the protocol driver, and the filter code, wherein said filter code is coupled to said shared memory to store information regarding packets received over the network, and wherein said security application is coupled to the shared memory buffer to evaluate information stored in the shared memory buffer.

37. (Original) The computer system of claim 34, wherein the install is performed remotely from a host computer on said network.

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38. (Original) A computer implemented method comprising:

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distributing from a remote host across a network to a plurality of computers code to be installed by each of said plurality of computers, each of said plurality of computers including routines to be executed to provide a communication path between a media access control unit coupled to the network and a protocol driver, said communication path for packets transmitted across said network;

transmitting from the remote host to each of the plurality of computers a command to cause each of the plurality of computers to execute said code; and

each of the plurality of computers responsive to said command performing, installing a driver in the communication path between the media access control unit and the protocol driver, said installed driver being enabled, without restart of said computer, to evaluate selectively allowing continued transmission of different ones of said packets received over said network along the communication path.

39. (Original) The method of claim 38, wherein said installing is performed using a patching technique.

40. (Original) The method of claim 38, wherein each of the plurality computers responsive to said command also perform, forming a shared memory buffer between a system address space that stores the protocol driver and a user space that stores a security application, wherein said driver is coupled to said shared memory to store information regarding packets received over the network, wherein said application is coupled to the shared memory buffer to evaluate information stored in the shared memory buffer.

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41. (Original) The method of claim 39 wherein said installing includes installing the driver in-between the network driver interface and the protocol driver.

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42. (Original) A machine-readable medium that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

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distributing from a remote host across a network to a plurality of computers code to be installed by each of said plurality of computers, each of said plurality of computers including routines to be executed to provide a communication path between a media access control unit coupled to the network and a protocol driver, said communication path for packets transmitted across said network;

transmitting from the remote host to each of the plurality of computers a command to cause each of the plurality of computers to execute said code; and

each of the plurality of computers responsive to said command performing, installing a driver in the communication path between the media access control unit and the protocol driver, said installed driver being enabled, without restart of said computer, to evaluate selectively allowing continued transmission of different ones of said packets received over said network along the communication path.

43. (Original) The machine-readable medium of claim 42, wherein said installing is performed using a patching technique.

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44. (Original) The machine-readable medium of claim 42, wherein each of the plurality of computers responsive to said command also perform, forming a shared memory buffer between a system address space that stores the protocol driver and a user space that stores a security application, wherein said driver is coupled to said shared memory to store information regarding packets received over the network, wherein said application is coupled to the shared memory buffer to evaluate information stored in the shared memory buffer.

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3 | 45. (Currently Amended) A computer implemented method comprising:

installing into each of a plurality of computers on a network code that is part of a distributed packet security system, said code being installed such that packets transmitted across said network to a given one of said plurality of computers is received by said code before being providing provided to a protocol driver;

at least the first of said plurality of computers without being shutdown or restarted,

receiving a packet from said network; and

said code executing on said first computer selectively forwarding said packet onto the protocol driver depending upon parameters of the distributed packet base security system.

46. (Original) The method of claim 45, wherein said installing is performed using a patching technique.

47. (Original) The method of claim 45, wherein said installing is performed remotely over said network.

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B | 48. (Currently Amended) A machine-readable medium that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

installing and enabling, without shutdown or restart, on each of a plurality of computers on a network code that is part of a distributed packet security system, said code being installed such that packets transmitted across said network to a given one of said plurality of computers is received by said code before being providing provided to a protocol driver;

wherein said code, when executed responsive to one of said plurality of computers receiving a packet from said network, selectively forwards said packet onto the protocol driver depending upon parameters of the distributed packet base security system.

49. (Original) The machine-readable medium of claim 48, wherein said installing is performed using a patching technique.

50. (Original) The machine-readable medium of claim 48, wherein said installing is performed remotely over said network.

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51. (Currently Amended) A computer implemented method comprising:

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installing into each of a plurality of computers on a network first and second code that is part of a distributed packet security system, said first code being installed in a user address space, said second code being installed in a system address space, said second code being installed such that packets transmitted across said network to a given one of said plurality of computers is received by said second code before being providing provided to a protocol driver in said system space;

at least the first of said plurality of computers without being shutdown or restarted, receiving a packet from said network;

said second code storing at least certain information from said packet into a shared memory buffer between the user address space and the system address space; and

said first code accessing information from said shared memory buffer.

52. (Original) The method of claim 51, wherein said installing is performed using a patching technique.

53. (Original) The method of claim 51, wherein said installing is performed remotely over said network.

54. (Original) The method of claim 51, wherein said second code is in a communication path between a network driver interface and the protocol driver.

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55. (Currently Amended) A machine-readable medium that provides instructions, which when executed by a set of processors, cause said set of processors to perform operations comprising:

installing and enabling, without shutdown or restart, on each of a plurality of computers on a network first and second code that is part of a distributed packet security system, said first code being installed in a user address space, said second code being installed in a system address space, said second code being installed such that packets transmitted across said network to a given one of said plurality of computers is received by said second code before being provided provided to a protocol driver in said system space;

wherein said second code, when executed responsive to a first of said plurality of computers receiving a packet from said network, stores at least certain information from said packet into a shared memory buffer between the user address space and the system address space; and

wherein said first code when executed by said first computer accesses said information from said shared memory buffer.

56. (Original) The machine-readable medium of claim 54, wherein said installing is performed using a patching technique.

57. (Original) The machine-readable medium of claim 54, wherein said installing is performed remotely over said network.

58. (Original) The method of claim 55, wherein said second code is in a communication path between a network driver interface and the protocol driver.